

APPLICATION FOR FEDERAL ASSISTANCE
SF 424 (R&R)

3. DATE RECEIVED BY STATE		State Application Identifier	
1. TYPE OF SUBMISSION		4. a. Federal Identifier	
<input type="checkbox"/> Pre-application <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application		N00014	
2. DATE SUBMITTED		b. Agency Routing Identifier	
08/19/2020		035 [Millsaps, Knox]	
Applicant Identifier		c. Previous Grants.gov Tracking ID	
OSP#217835			
5. APPLICANT INFORMATION			
Legal Name:		Organizational DUNS:	
PENNSYLVANIA STATE UNIVERSITY-UNIV PARK		003403953	
Department:		Division:	
Street1:		City:	
Office of Sponsored Programs		University Park	
Street2:		County / Parish:	
110 Technology Center Building		Centre	
State:		Province:	
PA: Pennsylvania			
Country:		ZIP / Postal Code:	
USA: UNITED STATES		16802-7000	
Person to be contacted on matters involving this application			
Prefix:		First Name:	
		Youyou	
Last Name:		Middle Name:	
Cheng			
Position/Title:		Suffix:	
Director of Grants and Contracts			
Street1:		City:	
112 Hammond Building		University Park	
Street2:		County / Parish:	
		Centre	
State:		Province:	
PA: Pennsylvania			
Country:		ZIP / Postal Code:	
USA: UNITED STATES		16802-7000	
Phone Number:		Fax Number:	
814-865-6185			
Email:			
yuc33@psu.edu			
6. EMPLOYER IDENTIFICATION (EIN) or (TIN):			
246000376			
7. TYPE OF APPLICANT:			
<input checked="" type="checkbox"/> Other (specify)			
Other (Specify): State Related Institution of Higher Education			
Small Business Organization Type			
<input type="checkbox"/> Women Owned <input type="checkbox"/> Socially and Economically Disadvantaged			
8. TYPE OF APPLICATION:			
<input checked="" type="checkbox"/> New <input type="checkbox"/> Resubmission			
<input type="checkbox"/> Renewal <input type="checkbox"/> Continuation <input type="checkbox"/> Revision			
If Revision, mark appropriate box(es).			
<input type="checkbox"/> A. Increase Award <input type="checkbox"/> B. Decrease Award <input type="checkbox"/> C. Increase Duration <input type="checkbox"/> D. Decrease Duration			
<input type="checkbox"/> E. Other (specify):			
Is this application being submitted to other agencies? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> What other Agencies?			
9. NAME OF FEDERAL AGENCY:		10. CATALOG OF FEDERAL DOMESTIC ASSISTANCE NUMBER:	
Office of Naval Research		12.300	
		TITLE:	
		Basic and Applied Scientific Research	
11. DESCRIPTIVE TITLE OF APPLICANT'S PROJECT:			
Supporting the Navy Educational Workforce Through Diversity and Inclusion			
12. PROPOSED PROJECT:		13. CONGRESSIONAL DISTRICT OF APPLICANT	
Start Date		Ending Date	
10/01/2020		09/30/2024	
		PA-012	

14. PROJECT DIRECTOR/PRINCIPAL INVESTIGATOR CONTACT INFORMATION

Prefix: First Name: Middle Name:
 Last Name: Suffix:
 Position/Title:
 Organization Name:
 Department: Division:
 Street1:
 Street2:
 City: County / Parish:
 State: Province:
 Country: ZIP / Postal Code:
 Phone Number: Fax Number:
 Email:

15. ESTIMATED PROJECT FUNDING

a. Total Federal Funds Requested
 b. Total Non-Federal Funds
 c. Total Federal & Non-Federal Funds
 d. Estimated Program Income

16. IS APPLICATION SUBJECT TO REVIEW BY STATE EXECUTIVE ORDER 12372 PROCESS?

a. YES ☐ THIS PREAPPLICATION/APPLICATION WAS MADE AVAILABLE TO THE STATE EXECUTIVE ORDER 12372 PROCESS FOR REVIEW ON:
 DATE:
 b. NO ☒ PROGRAM IS NOT COVERED BY E.O. 12372; OR
☐ PROGRAM HAS NOT BEEN SELECTED BY STATE FOR REVIEW

17. By signing this application, I certify (1) to the statements contained in the list of certifications* and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances * and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 18, Section 1001)

☒ I agree

*The list of certifications and assurances, or an Internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

18. SFLL (Disclosure of Lobbying Activities) or other Explanatory Documentation

19. Authorized Representative

Prefix: First Name: Middle Name:
 Last Name: Suffix:
 Position/Title:
 Organization:
 Department: Division:
 Street1:
 Street2:
 City: County / Parish:
 State: Province:
 Country: ZIP / Postal Code:
 Phone Number: Fax Number:
 Email:

Signature of Authorized Representative

John W. Hanold

Date Signed

08/19/2020

20. Pre-application

21. Cover Letter Attachment

RESEARCH & RELATED Other Project Information

OMB Number: 4040-0001
Expiration Date: 12/31/2022

1. Are Human Subjects Involved? ☐ Yes ☒ No

1.a. If YES to Human Subjects

Is the Project Exempt from Federal regulations? ☐ Yes ☐ No

If yes, check appropriate exemption number. ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8

If no, is the IRB review Pending? ☐ Yes ☐ No

IRB Approval Date:

Human Subject Assurance Number:

2. Are Vertebrate Animals Used? ☐ Yes ☒ No

2.a. If YES to Vertebrate Animals

Is the IACUC review Pending? ☐ Yes ☐ No

IACUC Approval Date:

Animal Welfare Assurance Number:

3. Is proprietary/privileged information included in the application? ☐ Yes ☒ No

4.a. Does this Project Have an Actual or Potential Impact - positive or negative - on the environment? ☐ Yes ☒ No

4.b. If yes, please explain:

4.c. If this project has an actual or potential impact on the environment, has an exemption been authorized or an environmental assessment (EA) or environmental impact statement (EIS) been performed? ☐ Yes ☐ No

4.d. If yes, please explain:

5. Is the research performance site designated, or eligible to be designated, as a historic place? ☐ Yes ☒ No

5.a. If yes, please explain:

6. Does this project involve activities outside of the United States or partnerships with international collaborators? ☐ Yes ☒ No

6.a. If yes, identify countries:

6.b. Optional Explanation:

7. Project Summary/Abstract

8. Project Narrative

9. Bibliography & References Cited

10. Facilities & Other Resources

11. Equipment

12. Other Attachments ☐

Project Abstract

The Project Abstract must not exceed one page and must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained description of the project and should contain a statement of objectives and methods to be employed. It should be informative to other persons working in the same or related fields and insofar as possible understandable to a technically literate lay reader. This Abstract must not include any proprietary/confidential information.

* Please click the add attachment button to complete this entry.

Add Attachment

Delete Attachment

View Attachment

ProjSummary1027437259.pdf

RESEARCH & RELATED BUDGET - Budget Period 1

OMB Number: 4040-0001

Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS: 003403953

Enter name of Organization: PENNSYLVANIA STATE UNIVERSITY-UNIV PARK

Budget Type: ☒ Project ☐ Subaward/Consortium

Budget Period: 1

Start Date: 10/01/2020

End Date: 09/30/2021

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
						Cal.	Acad.	Sum.			
	Karen	Ann	Thole		0.00		0.00	0.00	0.00	0.00	0.00

Project Role: PD/PI

Additional Senior Key Persons:

Add Attachment

Delete Attachment

View Attachment

Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

0.00

B. Other Personnel

Number of Personnel	Project Role	Cal.	Months		Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
			Cal.	Acad.	Sum.		
<input type="text"/>	Post Doctoral Associates	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	Graduate Students	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	Undergraduate Students	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	Secretarial/Clerical	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	Total Number Other Personnel						Total Other Personnel <input type="text"/>

Total Salary, Wages and Fringe Benefits (A+B)

0.00

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item	Funds Requested (\$)
<input type="text"/>	<input type="text"/>

Additional Equipment:

Add Attachment

Delete Attachment

View Attachment

Total funds requested for all equipment listed in the attached file

Total Equipment

D. Travel

		Funds Requested (\$)
1.	Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)	0 . 00
2.	Foreign Travel Costs	0 . 00
Total Travel Cost		0 . 00

E. Participant/Trainee Support Costs

		Funds Requested (\$)
1.	Tuition/Fees/Health Insurance	0 . 00
2.	Stipends	0 . 00
3.	Travel	0 . 00
4.	Subsistence	0 . 00
5.	Other	
	Number of Participants/Trainees	Total Participant/Trainee Support Costs
		0 . 00

F. Other Direct Costs

		Funds Requested (\$)
1.	Materials and Supplies	
2.	Publication Costs	
3.	Consultant Services	
4.	ADP/Computer Services	
5.	Subawards/Consortium/Contractual Costs	
6.	Equipment or Facility Rental/User Fees	
7.	Alterations and Renovations	
8.	All Other Direct Costs	50,000.00
9.		
10.		
Total Other Direct Costs		50,000.00

G. Direct Costs

		Funds Requested (\$)
Total Direct Costs (A thru F)		50,000.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
MTDC	0.00	0.00	0.00
Total Indirect Costs			0.00

Cognizant Federal Agency(Agency Name, POC Name, and
POC Phone Number)

Office of Naval Research, Chicago Office, 312-886-5423

I. Total Direct and Indirect Costs

		Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H)		50,000.00

J. Fee

Funds Requested (\$)
0.00

K. Total Costs and Fee

		Funds Requested (\$)
Total Costs and Fee (I + J)		50,000.00

L. Budget Justification

(Only attach one file.)

Basic_Budget_Justification_20201027465

Add Attachment

Delete Attachment

View Attachment

RESEARCH & RELATED BUDGET - Budget Period 2

OMB Number: 4040-0001

Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS: 003403953

Enter name of Organization: PENNSYLVANIA STATE UNIVERSITY-UNIV PARK

Budget Type: ☒ Project ☐ Subaward/Consortium

Budget Period: 2

Start Date: 10/01/2021

End Date: 09/30/2022

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
						Cal.	Acad.	Sum.			
	Karen	Ann	Thole		0.00		0.00	0.00	0.00	0.00	0.00

Project Role: PD/PI

Additional Senior Key Persons:

Add Attachment

Delete Attachment

View Attachment

Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

0.00

B. Other Personnel

Number of Personnel	Project Role	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
		Cal.	Acad.	Sum.			
	Post Doctoral Associates						
	Graduate Students						
	Undergraduate Students						
	Secretarial/Clerical						
	Total Number Other Personnel						

Total Other Personnel

Total Salary, Wages and Fringe Benefits (A+B)

0.00

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item	Funds Requested (\$)

Additional Equipment:

Add Attachment

Delete Attachment

View Attachment

Total funds requested for all equipment listed in the attached file

Total Equipment

D. Travel

		Funds Requested (\$)
1.	Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)	0 . 00
2.	Foreign Travel Costs	0 . 00
Total Travel Cost		0 . 00

E. Participant/Trainee Support Costs

		Funds Requested (\$)
1.	Tuition/Fees/Health Insurance	0 . 00
2.	Stipends	0 . 00
3.	Travel	0 . 00
4.	Subsistence	0 . 00
5.	Other	
	Number of Participants/Trainees	Total Participant/Trainee Support Costs
		0 . 00

F. Other Direct Costs

		Funds Requested (\$)
1.	Materials and Supplies	
2.	Publication Costs	
3.	Consultant Services	
4.	ADP/Computer Services	
5.	Subawards/Consortium/Contractual Costs	
6.	Equipment or Facility Rental/User Fees	
7.	Alterations and Renovations	
8.	All Other Direct Costs	50,000.00
9.		
10.		
Total Other Direct Costs		50,000.00

G. Direct Costs

	Funds Requested (\$)
Total Direct Costs (A thru F)	50,000.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
MTDC	0.00	0.00	0.00
Total Indirect Costs			0.00

Cognizant Federal Agency

(Agency Name, POC Name, and POC Phone Number)

Office of Naval Research, Chicago Office, 312-886-5423

I. Total Direct and Indirect Costs

	Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H)	50,000.00

J. Fee

	Funds Requested (\$)
	0.00

K. Total Costs and Fee

	Funds Requested (\$)
Total Costs and Fee (I + J)	50,000.00

L. Budget Justification

(Only attach one file.)

Basic_Budget_Justification_20201027465

Add Attachment

Delete Attachment

View Attachment

RESEARCH & RELATED BUDGET - Budget Period 3

OMB Number: 4040-0001
Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS: 003403953

Enter name of Organization: PENNSYLVANIA STATE UNIVERSITY-UNIV PARK

Budget Type: ☒ Project ☐ Subaward/Consortium

Budget Period: 3 Start Date: 10/01/2022 End Date: 09/30/2023

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
						Cal.	Acad.	Sum.			
	Karen	Ann	Thole		0.00		0.00	0.00	0.00	0.00	0.00

Project Role: PD/PI

Additional Senior Key Persons: Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

B. Other Personnel

Number of Personnel	Project Role	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)	
		Cal.	Acad.	Sum.				
<input type="text"/>	Post Doctoral Associates	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Graduate Students	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Undergraduate Students	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Secretarial/Clerical	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Total Number Other Personnel						Total Other Personnel	<input type="text"/>
Total Salary, Wages and Fringe Benefits (A+B)							<input type="text" value="0.00"/>	

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item	Funds Requested (\$)
<input type="text"/>	<input type="text"/>

Additional Equipment: Total funds requested for all equipment listed in the attached file Total Equipment

D. Travel

		Funds Requested (\$)
1.	Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)	0 . 00
2.	Foreign Travel Costs	0 . 00
Total Travel Cost		0 . 00

E. Participant/Trainee Support Costs

		Funds Requested (\$)
1.	Tuition/Fees/Health Insurance	0 . 00
2.	Stipends	0 . 00
3.	Travel	0 . 00
4.	Subsistence	0 . 00
5.	Other	
	Number of Participants/Trainees	Total Participant/Trainee Support Costs
		0 . 00

F. Other Direct Costs

		Funds Requested (\$)
1.	Materials and Supplies	
2.	Publication Costs	
3.	Consultant Services	
4.	ADP/Computer Services	
5.	Subawards/Consortium/Contractual Costs	
6.	Equipment or Facility Rental/User Fees	
7.	Alterations and Renovations	
8.	All Other Direct Costs	50,000.00
9.		
10.		
Total Other Direct Costs		50,000.00

G. Direct Costs

	Funds Requested (\$)
Total Direct Costs (A thru F)	50,000.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
MTDC	0.00	0.00	0.00
Total Indirect Costs			0.00

Cognizant Federal Agency(Agency Name, POC Name, and
POC Phone Number)

Office of Naval Research, Chicago Office, 312-886-5423

I. Total Direct and Indirect Costs

	Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H)	50,000.00

J. Fee

Funds Requested (\$)
0.00

K. Total Costs and Fee

Funds Requested (\$)
Total Costs and Fee (I + J) 50,000.00

L. Budget Justification

(Only attach one file.)

Basic_Budget_Justification_20201027465

Add Attachment

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RESEARCH & RELATED BUDGET - Budget Period 4

OMB Number: 4040-0001
Expiration Date: 12/31/2022

ORGANIZATIONAL DUNS: 003403953

Enter name of Organization: PENNSYLVANIA STATE UNIVERSITY-UNIV PARK

Budget Type: ☒ Project ☐ Subaward/Consortium

Budget Period: 4 Start Date: 10/01/2023 End Date: 09/30/2024

A. Senior/Key Person

Prefix	First	Middle	Last	Suffix	Base Salary (\$)	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)
						Cal.	Acad.	Sum.			
	Karen	Ann	Thole		0.00		0.00	0.00	0.00	0.00	0.00

Project Role: PD/PI

Additional Senior Key Persons: Total Funds requested for all Senior Key Persons in the attached file

Total Senior/Key Person

B. Other Personnel

Number of Personnel	Project Role	Months			Requested Salary (\$)	Fringe Benefits (\$)	Funds Requested (\$)	
		Cal.	Acad.	Sum.				
<input type="text"/>	Post Doctoral Associates	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Graduate Students	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Undergraduate Students	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Secretarial/Clerical	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/>	Total Number Other Personnel						Total Other Personnel	<input type="text"/>
Total Salary, Wages and Fringe Benefits (A+B)							<input type="text" value="0.00"/>	

C. Equipment Description

List items and dollar amount for each item exceeding \$5,000

Equipment item	Funds Requested (\$)
<input type="text"/>	<input type="text"/>

Additional Equipment: Total funds requested for all equipment listed in the attached file Total Equipment

D. Travel

		Funds Requested (\$)
1.	Domestic Travel Costs (Incl. Canada, Mexico and U.S. Possessions)	0 . 00
2.	Foreign Travel Costs	0 . 00
Total Travel Cost		0 . 00

E. Participant/Trainee Support Costs

		Funds Requested (\$)
1.	Tuition/Fees/Health Insurance	0 . 00
2.	Stipends	0 . 00
3.	Travel	0 . 00
4.	Subsistence	0 . 00
5.	Other	
	Number of Participants/Trainees	Total Participant/Trainee Support Costs
		0 . 00

F. Other Direct Costs

		Funds Requested (\$)
1.	Materials and Supplies	
2.	Publication Costs	
3.	Consultant Services	
4.	ADP/Computer Services	
5.	Subawards/Consortium/Contractual Costs	
6.	Equipment or Facility Rental/User Fees	
7.	Alterations and Renovations	
8.	All Other Direct Costs	50,000.00
9.		
10.		
Total Other Direct Costs		50,000.00

G. Direct Costs

	Funds Requested (\$)
Total Direct Costs (A thru F)	50,000.00

H. Indirect Costs

Indirect Cost Type	Indirect Cost Rate (%)	Indirect Cost Base (\$)	Funds Requested (\$)
MTDC	0.00	0.00	0.00
Total Indirect Costs			0.00

Cognizant Federal Agency(Agency Name, POC Name, and
POC Phone Number)

Office of Naval Research, Chicago Office, 312-886-5423

I. Total Direct and Indirect Costs

	Funds Requested (\$)
Total Direct and Indirect Institutional Costs (G + H)	50,000.00

J. Fee

Funds Requested (\$)
0.00

K. Total Costs and Fee

Funds Requested (\$)
Total Costs and Fee (I + J) 50,000.00

L. Budget Justification

(Only attach one file.)

Basic_Budget_Justification_20201027465

Add Attachment

Delete Attachment

View Attachment

RESEARCH & RELATED BUDGET - Cumulative Budget

		Totals (\$)
Section A, Senior/Key Person		0.00
Section B, Other Personnel		
Total Number Other Personnel		
Total Salary, Wages and Fringe Benefits (A+B)		0.00
Section C, Equipment		
Section D, Travel		0.00
1. Domestic	0.00	
2. Foreign	0.00	
Section E, Participant/Trainee Support Costs		0.00
1. Tuition/Fees/Health Insurance	0.00	
2. Stipends	0.00	
3. Travel	0.00	
4. Subsistence	0.00	
5. Other		
6. Number of Participants/Trainees		
Section F, Other Direct Costs		200,000.00
1. Materials and Supplies		
2. Publication Costs		
3. Consultant Services		
4. ADP/Computer Services		
5. Subawards/Consortium/Contractual Costs		
6. Equipment or Facility Rental/User Fees		
7. Alterations and Renovations		
8. Other 1	200,000.00	
9. Other 2		
10. Other 3		
Section G, Direct Costs (A thru F)		200,000.00
Section H, Indirect Costs		0.00
Section I, Total Direct and Indirect Costs (G + H)		200,000.00
Section J, Fee		0.00
Section K, Total Costs and Fee (I + J)		200,000.00

RESEARCH & RELATED Senior/Key Person Profile (Expanded)

PROFILE - Project Director/Principal Investigator					
Prefix:	<input type="text" value="Dr."/>	* First Name:	<input type="text" value="Karen"/>	Middle Name:	<input type="text" value="Ann"/>
* Last Name:	<input type="text" value="Thole"/>		Suffix:	<input type="text"/>	
Position/Title:	<input type="text" value="Department Head and Distinguished Professor"/>		Department:	<input type="text" value="Mechanical Engineering"/>	
Organization Name:	<input type="text" value="PENNSYLVANIA STATE UNIVERSITY-UNIV PARK"/>			Division:	<input type="text" value="Engineering"/>
* Street1:	<input type="text" value="0137 REBER BUILDING"/>				
Street2:	<input type="text"/>				
* City:	<input type="text" value="UNIVERSITY PARK"/>	County/ Parish:	<input type="text"/>		
* State:	<input type="text" value="PA: Pennsylvania"/>		Province:	<input type="text"/>	
* Country:	<input type="text" value="USA: UNITED STATES"/>		* Zip / Postal Code:	<input type="text" value="16802-7000"/>	
* Phone Number:	<input type="text" value="814-865-2519"/>	Fax Number:	<input type="text"/>		
* E-Mail:	<input type="text" value="kat18@psu.edu"/>				
Credential, e.g., agency login:	<input type="text"/>				
* Project Role:	<input type="text" value="PD/PI"/>	Other Project Role Category:	<input type="text"/>		
Degree Type:	<input type="text"/>				
Degree Year:	<input type="text"/>				
* Attach Biographical Sketch	<input type="text"/>	Add Attachment	Delete Attachment	View Attachment	
Attach Current & Pending Support	<input type="text"/>	Add Attachment	Delete Attachment	View Attachment	

PROFILE - Senior/Key Person 1					
Prefix:	<input type="text"/>	* First Name:	<input type="text"/>	Middle Name:	<input type="text"/>
* Last Name:	<input type="text"/>		Suffix:	<input type="text"/>	
Position/Title:	<input type="text"/>	Department:	<input type="text"/>		
Organization Name:	<input type="text"/>			Division:	<input type="text"/>
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* Country:	<input type="text" value="USA: UNITED STATES"/>		* Zip / Postal Code:	<input type="text"/>	
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* E-Mail:	<input type="text"/>				
Credential, e.g., agency login:	<input type="text"/>				
* Project Role:	<input type="text"/>	Other Project Role Category:	<input type="text"/>		
Degree Type:	<input type="text"/>				
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Attach Biographical Sketch	<input type="text"/>	Add Attachment	Delete Attachment	View Attachment	
Attach Current & Pending Support	<input type="text"/>	Add Attachment	Delete Attachment	View Attachment	

Supporting the Navy Educational Workforce Through Diversity and Inclusion

Department of Mechanical Engineering
Pennsylvania State University, University Park, PA

August 13, 2020

Karen A. Thole, Department Head and Distinguished Professor, kthole@psu.edu

Approved for Public Release

Project Summary

To solve today's engineering challenges in energy, defense, environment, health, and society, we need a wide range of solutions, which can be realized by having a diverse group of engineers who have strong technical backgrounds. This document proposes activities that will develop a diverse and inclusive workforce for the Navy within the Department of Mechanical Engineering at the Pennsylvania State University. Specifically, over four years we will engage and prepare undergraduate and graduate students from a diverse population who are highly talented to participate in the many opportunities brought forth by the Navy including the following: Department of Defense National Defense Science and Engineering Graduate Fellow Program (NDSEG); the Naval Research Enterprise Intern Program (NREIP); and the Science, Mathematics and Research for Transformation (SMART) Program. The engagement and preparation of these undergraduate and graduate students will be accomplished through close collaboration with existing diversity programs in Penn State's College of Engineering. Faculty programs supported by the Office of Naval Research including the sabbatical leave program and the summer faculty research program will be highlighted to the diverse faculty within the Department of Mechanical Engineering. This proposal provides background information regarding the Department of Mechanical Engineering and a proposed plan towards the development of students whose gender, race, ethnic, cultural, and/or national background contribute to the diversity of the student body to assist with a diverse and inclusive workforce for the Navy.

BUDGET JUSTIFICATION
The Pennsylvania State University

Participant Support Cost - \$50,000/year is budgeted for:

- Professional support to assist students in preparation of applications for the NDSEG, SMART, and NREIP, \$1,000/y
- Travel to NAVAIR and the Navy Yard (DC), \$1,000/y
- Targeted scholarships for ME undergraduates enrolled with the Women in Engineering Program or successor program (11 at \$2,000 each), \$22,000/y
- Top up fellowships for students who contribute to the diversity of the graduate student population (5 at \$5,000 each), \$25,000/y

Facilities and Administrative Costs - F&A rates are negotiated and approved by the Office of Naval Research, Penn State's cognizant federal agency. Penn State's current provisional on-campus rate for research is (b) (4) of MTDC from July 1, 2020, through June 30, 2021. New awards and new competitive segments with an effective date of July 1, 2021, or later shall be subject to adjustment when superseding Government approved rates are established. Per 2 CFR 200 (Appendix III, Section C.7), the actual F&A rates used will be fixed at the time of the initial award for the duration of the competitive segment.

BAA Number: N00014-20-S-B001

Technical Proposal:

**Supporting the Navy Educational Workforce
Through Diversity and Inclusion**

PI: Professor Karen A. Thole

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Pennsylvania State University, University Park, PA
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Period of Performance: October 1, 2020 – September 30, 2024

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Supporting the Navy Educational Workforce Through Diversity and Inclusion

Introduction

To solve today's engineering challenges in energy, defense, environment, health, and society, we need a wide range of solutions, which can be realized by having a diverse group of engineers who have strong technical backgrounds. This document proposes activities that will develop a diverse and inclusive workforce for the Navy within the Department of Mechanical Engineering at the Pennsylvania State University. Specifically, over four years we will engage and prepare undergraduate and graduate students from a diverse population who are highly talented to participate in the many opportunities brought forth by the Navy including the following: Department of Defense National Defense Science and Engineering Graduate Fellow Program (NDSEG); the Naval Research Enterprise Intern Program (NREIP); and the Science, Mathematics and Research for Transformation (SMART) Program. The engagement and preparation of these undergraduate and graduate students will be accomplished through close collaboration with existing diversity programs in Penn State's College of Engineering. Faculty programs supported by the Office of Naval Research including the sabbatical leave program and the summer faculty research program will be highlighted to the diverse faculty within the Department of Mechanical Engineering. This proposal provides background information regarding the Department of Mechanical Engineering and a proposed plan towards the development of students whose gender, race, ethnic, cultural, and/or national background contribute to the diversity of the student body to assist with a diverse and inclusive workforce for the Navy.

Department of Mechanical Engineering

In the Department of Mechanical Engineering at Penn State, we serve more than 750 undergraduate students and more than 330 graduate students. The Department's faculty members are actively involved in providing a hands-on education at the undergraduate and graduate levels along with many individualized research opportunities.

The Department is committed to solving problems related to health, happiness, and safety, and along the way, often changing the way people think about the world. Critical to reaching these goals are diversity and inclusion, with different perspectives bringing new, innovative solutions. The Department

of Mechanical Engineering at the Pennsylvania State University values and is committed to diversity, equity, and inclusion for their community of faculty, staff, and students. In the past ten years, faculty diversity increased in several ways: the percentage of female professors increased from 6% to 25%, Black faculty increased from zero to two, and Hispanic faculty increased from one to two. Also, over the past ten years, the percentage of women ME undergraduates has increased from 9% to 18%; however, in the past three years the increase has been from 14% to 18%, which is because of two very defined activities that are outlined below. The number of other under-represented students in the Department is still relatively low at 6%, which is consistent with the national average.

It is also worth noting that the demographics of the faculty in the Department of Mechanical Engineering is such that nearly 50% are at the Assistant Professor level while the remainder are at the Associate and Full Professor levels. In the past five years, the Assistant Professor co-hort in ME have been successful in winning a PECASE, many NSF CAREER Awards, ONR YIPs, and AFOSR YIPs. These faculty bring tremendous opportunities to our undergraduate and graduate students in doing research in their laboratories with excellent, state-of-the-art equipment purchased through their start-up packages. These faculty are also seeking new research collaborations and many are working in areas of interest to the Navy.

Existing College of Engineering and Department Diversity and Inclusion Efforts

Numerous activities exist within Penn State's College of Engineering and the Department of Mechanical Engineering to promote diversity and inclusion within the faculty and students. Those involving students are briefly described in this section of the proposal.

Engineering Ambassador Program. By sharing our passion and pride, Engineering Ambassadors inspire K-12 students to challenge conventional ideas about science and engineering. Through communication and leadership, the Engineering Ambassadors strive to impact change as world-class engineers and seek to inspire the next generation of engineers to improve the health, happiness, and safety of our world. This program has been hugely successful with over 400 EAs over the life of the program. The Engineering Ambassador Program, which has heavy involvement from ME, has the mission to increase the diversity of those seeking engineering degrees and to strengthen the communication and leadership skills of those currently seeking engineering degrees. To increase the diversity, the Program emphasizes advanced communication skills in front of middle and high school classes. In the 2020/21 academic year, 68% of

the EAs are women. The EAs typically reach about 5,000 K-12 students each year and hope to expand through virtual outreach that is not geographically bound.

Multi-Cultural Engineering Program. The Multicultural Engineering Program (MEP) strives to foster a welcoming environment that celebrates culture and inclusion. It is our mission to improve the recruitment and retention of underrepresented groups who are pursuing a degree in engineering. We aim to do this through developing students both academically and professionally and through engagement in impactful leadership opportunities. Engagement with incoming first year students occurs through our flagship summer programming. _The Engineering Summer Bridge Program is a 6-week academic enhancement program designed to assist in the transition from high school to college. Our research indicates that participants achieve higher GPAs than non-participants, are more likely to graduate from the College of Engineering, are more likely to obtain competitive-salary internships, co-ops and full time employment and acclimate more readily to the college environment. In 2019, 35 students participated in the Engineering Summer Bridge Program. The Multicultural Engineering Program Orientation (MEPO) is an exciting three day orientation program where participants engage in an engineering design competition, receive mentorship from upper-level students, become acclimated to the resources on campus, develop professional development skills such as resumes and elevator pitches, and network with industry representative in our career networking luncheon. The MEPO Networking Luncheon enables our industry partners to connect with diverse future interns and employees who are eager to begin on the path of their future careers. In 2019, our partners interacted with 92 incoming first year participants and 45 upper level student staff. 31 of our first-year student participants identified as women of color and 14 students indicated Mechanical Engineering as their intended major. MEP Nights are monthly professional development events for all of our students. Each event is focused on a specific theme such as career readiness, student research, and global engagement.

It's All About ME. Each year, the Department works together from women leaders in the ASME student network to hold many events focused on first and second year students to alert them to opportunities in the discipline. These activities include lab tours, discussions about internships and study abroad opportunities, and lunches with the Department Head. This program has been quite successful in building a co-hort of women undergraduates in ME.

Technical Approach:

Proposed Activities to Develop a Diverse and Inclusive Workforce for the Navy

The activities outlined in this proposal are to broaden the awareness of the many opportunities afforded by the Navy to the faculty and students in the Department of Mechanical Engineering at Penn State. Emphasis will be placed on developing a diverse and inclusive pipeline of talent for the Navy.

1. *Highlighting Navy Opportunities to the Students and Faculty.* Over the next four years we will highlight the following Navy programs to our students: Department of Defense National Defense Science and Engineering Graduate Fellow Program (NDSEG); the Naval Research Enterprise Intern Program (NREIP); and the Science, Mathematics and Research for Transformation (SMART) Program. All of the undergraduates in the Department of Mechanical Engineering will be made aware of these opportunities through incorporating information about these opportunities into two of our required undergraduate courses: ME 390 (for juniors) and ME 490 (for seniors). These two courses focus on academic and career development.

To further prepare our undergraduate and graduate students for these opportunities, special lunch-and-learn sessions will be set up to learn about the NDSEG, NREIP, and SMART programs. Strong collaboration in encouraging students to attend will take place with the various programs already mentioned (Engineering Ambassadors, MEP, and It's All About ME) as well as the Women in Engineering Program, Society of Women Engineers (SWE), National Society of Black Engineers (NSBE) and Society of Hispanic Professional Engineers (SHPE). Resources will also be provided to students in assisting preparation of the applications to these programs.

Faculty will be made aware of the sabbatical leave program and the summer faculty research program through invited visits and focused meetings with ONR personnel once per year.

2. *Targeted Undergraduate and Graduate Scholarships.* Over the past three years there has been an increase in the percentage of women ME undergraduates through many supportive efforts. The Department will make use of the requested funding for scholarships awarded to students who are actively enrolled with the Women in Engineering Program or a successor program and who are considering mechanical engineering during the decision making time prior to entering their specific engineering degree program (generally after the first year at Penn State). These students will be involved in the informational session described by the previous activity highlighting the Navy opportunities.

At the graduate level, the Department has made a conscious effort to increase the US population of students and, in particular, diversity the student population. The Department has made this effort by recruiting from the highly qualified undergraduate pool in the Department through offering a five year guarantee of support to complete their PhD as well as a \$5000 “signing bonus. These efforts resulted in a 33% acceptance rate for those women who were offered admission to our ME Program. The proposed request is to continue these aggressive recruiting efforts adding encouragement for students to fill out the applications for the SMART and NDSEG Programs. Note that these proposed one-time fellowships are not for those students who are receiving a SMART or NDSEG fellowship but rather for students prior to them applying for the SMART or NDSEG fellowships for further encouragement to apply.

Proposed Funds Usage

The proposed budget is to support a four year program to support the Navy’s workforce with a focus on diversity and inclusion. As indicated in the budget below, support will be provided to assist students in preparing Navy-related scholarships/fellowships. In addition, to further excite students about the opportunities with the Navy, annual trips will be made for those holding the scholarships to NAVAIR and the Navy Yard in Washington, DC. Measures of success will be measured in the number of applications to the Navy programs previously described in the proposal. The proposed start date is October 1, 2020 with an end date of September 30, 2024.

Activity	Year 1	Year 2	Year 3	Year 4
Professional support to assist students in preparation of applications for the NDSEG, SMART, and NREIP	\$1,000	\$1,000	\$1,000	\$1,000
Travel to NAVAIR and the Navy Yard (DC)	\$1,000	\$1,000	\$1,000	\$1,000
Targeted scholarships for ME undergraduates enrolled with the Women in Engineering Program or successor program (11 at \$2,000 each)	\$22,000	\$22,000	\$22,000	\$22,000
Top up fellowships for students who contribute to the diversity of the graduate student population (5 at \$5,000 each)	\$25,000	\$25,000	\$25,000	\$25,000
Annual Total Requested	\$50,000	\$50,000	\$50,000	\$50,000

Name of Key Person: Karen A. Thole
Key Person's Employer: Dept of Mechanical Engineering, Penn State University

Education:

University of Illinois at Urbana-Champaign	Mechanical Engineering	B.S., 1982
University of Illinois at Urbana-Champaign	Mechanical Engineering	M.S., 1984
University of Texas at Austin	Mechanical Engineering	Ph.D., 1992

Experience:

2006-present	Department Head	Mechanical Engineering Department
	Distinguished Professor	The Pennsylvania State University
2004-2006	Assistant Dept Head	Mechanical Engineering Department
	William Cross Prof	Virginia Polytechnic Institute and State University
2003-present	Professor	Mechanical Engineering Department
		Virginia Polytechnic Institute and State University
2000-2003	Associate Professor	Mechanical Engineering Department
		Virginia Polytechnic Institute and State University
1999-2000	Assistant Professor	Mechanical Engineering Department
		Virginia Polytechnic Institute and State University
1994-1998	Assistant Professor	Mechanical Engineering Department
		University of Wisconsin-Madison
1993-1994	Post-doc Researcher	Institute of Thermal Turbomachinery
		Karlsruhe Institute of Technology, Germany

Professional Affiliations, Registrations, Certifications, and Licenses: ASME (Fellow), AIAA (Associate Fellow), Associate Editor for *AIAA J of Thermophysics*, Editorial Board for *Physics of Fluids*

Publications, Awards, Honors, and Professional Recognition:

Ten Relevant Publications (over 270 peer-reviewed publications)

Monge-Concepción, I, Berdanier, R. A., Barringer, M. B., Thole, K. A. and Robak, C., 2020, "Evaluating the Effect of Vane Trailing Edge Flow on Turbine Rim Sealing" *Journal of Turbomachinery*, doi-org.ezaccess.libraries.psu.edu/10.1115/1.4047611

Snyder, J. C. and Thole, K. A., 2020, "Performance of Public Film Cooling Geometries Produced through Additive Manufacturing" *Journal of Turbomachinery*, vol. 142(5), pp. 051009.

Siroka, S., Berdanier, R. A., Thole, K. A., Chana, K., Haldeman, C. W., and Anthony, R. J., 2020, "Comparison of Thin Film Heat Flux Gauge Technologies Emphasizing Continuous-Duration Operation," *Journal of Turbomachinery*. DOI: <https://doi.org/10.1115/1.4045991>

Berdanier, R. A., Monge-Concepcion, I., Knisely, B. F., Barringer, M., Thole, K. A., Grover, E., 2019, "Scaling Sealing Effectiveness in a Stator-Rotor Cavity for Differing Blade Spans," *Journal of Turbomachinery*, Vol. 141 (5), pp. 051007.

Stimpson, C., Snyder, J., Thole, K. A., and Mongillo, D., 2018 "Effects of Coolant Feed Direction on Additively Manufactured Film Cooling Holes" *Journal of Turbomachinery*, Vol 140(11), pp. 111001.

Clark, K., Barringer, M., Johnson, D., Thole, K. A., Grover, E., and Robak, C., 2018 "Effects of Purge Flow Configuration on Sealing Effectiveness in a Rotor-Stator Cavity" *Journal of Engineering for Gas Turbines and Power*, vol. 140(11), pp. 112502.

- Town, J., Straub, D. Black, J., Thole, K. A., and Shih, T., 2018 “State-of-the-Art Cooling Technology for a Turbine Rotor Blade,” *Journal of Turbomachinery*, vol. 140 (7), pp. 071007.
- Clark, K., Barringer, M., Thole, K., Clum, C., Hiester, P., Memory, C., Robak, C., 2017, “Effects of Purge Jet Momentum on Sealing Effectiveness,” *Journal of Engineering for Gas Turbines and Power*, vol. 139(3), pp. 031904.
- Clark, K., Barringer, M., Thole, K. A., Clum, C., Hiester, P., Memory, C., Robak, C., “Using a Tracer Gas to Quantify Sealing Effectiveness for Engine Realistic Rim Seals,” International Gas Turbine and Aeroengine Congress and Exposition, Seoul, S. Korea, GT2016-58095.
- Bogard, D. G. and Thole, K. A., 2006, “Gas Turbine Film Cooling,” *AIAA Journal of Propulsion*, vol. 22, pp. 249-271.

Recent Awards

- AIAA Air Breathing Propulsion Award, 2019
- ABET Claire L. Felbinger Diversity Award, 2017
- 53rd AIAA/SAE/ASME Joint Propulsion Conference Best Paper Award, 2017
- University Distinguished Professor, Penn State, 2017
- ASME Edwin F. Church Medal for Engineering Education, 2016
- College of Engineering’s Distinguished Service Alumni Award, University of Illinois, 2016
- ASME George Westinghouse Gold Medal, 2015
- ASME Distinguished Service Award, 2015
- Howard B. Palmer Faculty Mentoring Award, Penn State, 2015
- Society of Women Engineers Distinguished Engineering Educator Award, 2014
- Distinguished Alumnae in Mechanical Science and Engineering, University of Illinois, 2013
- Rosemary Schraer Mentoring Award, Penn State, 2012
- U. S. White House *Champion of Change* in Science, Technology, Engineering, and Math, 2011
- Best Heat Transfer Paper, ASME’s International Gas Turbine Institute, 2005, 2009, 2013, 2016

K. A. Thole

Federal Current and Pending Support:

Title: Improving Turbine Efficiencies through Heat Transfer and Aerodynamic Research in the Steady Thermal Aero Research Turbine (START)

Sponsor: U.S. Department of Energy – National Energy Technology Laboratory

Total Amount: \$8,226,916

Period of Performance: 10/01/2015-09/30/2021

Location of Project: The Pennsylvania State University

Status: Active

Effort (person months): Cal: 4% 00

Title: Real-Time Health Monitoring of Gas Turbine Components Using Online Learning and High-Dimensional Data

Sponsor: DOE-UTSR as sub from Georgia Tech Research Corporation

Period of Performance: 10/1/2017-9/30/2020

Total Budget Requested: \$212,775

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0

Title: LES and RANS/DERM Modeling for Design Optimization of Additively and Conventionally Manufactured Internal Turbine Cooling Passages

Sponsor: US Department of Energy, National Energy Technology Laboratory - University Turbine Systems Research (UTSR)

Total Amount: \$600,000

Period of Performance: 01/01/2018-12/31/2020

Location of Project: The Pennsylvania State University

Status: Active

Effort (person months): Cal: 0.00 Acad: 0.00 Sumr: 0.00

Title: Integration of Sensors through Additive Manufacturing Leading to Increased Efficiencies of Gas turbines for Power Generation and Propulsion

Sponsor: Advanced Research Projects Agency-Energy

Period of Performance: 7/30/2019-7/30/2022

Total Budget Requested: \$5,879,897

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0

Title: Conjugate heat transfer for LES of gas turbine engines

Sponsor: U.S. Department of the Navy as sub from Cascade Technologies

Period of Performance: 9/11/2019-12/31/2020

Total Budget Requested: \$72,000

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 1%

Title: Integrated turbine component cooling designs facilitated by additive manufacturing and optimization

Sponsor: DOE-UTSR as sub from University of Texas at Austin

Period of Performance: 9/1/2019-8/31/2022

Total Budget Requested: \$400,000

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0

Title: Characterizing Coke Deposition in Additively Manufactured Parts

Sponsor: US Air Force as sub from Reaction Systems, Inc.

Period of Performance: 7/31/2019-9/30/2020

Total Budget Requested: \$56,000

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 1% AY

Title: Turbine Cooling through Additive Manufacturing – 56

Sponsor: FAA ASCENT

Period of Performance: 2/5/2020 – 2/5/2022

Total Budget Requested: \$800,000

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0

Title: Combustor Wall Cooling Concepts for Dirt Mitigation– 68

Sponsor: FAA ASCENT

Period of Performance: 6/1/2020-5/31/2021

Total Budget Requested: \$150,000

Location of Project: The Pennsylvania State University

Status: Active

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 1% Cal

Title: Novel Hot Gas Path Components for Gas Turbine Engines Enabled by Materials and AM Process Development

Sponsor: DOE as sub from Oak Ridge National Lab

Period of Performance: 4/1/2020-3/31/2023

Total Budget Requested: \$399,000

Location of Project: The Pennsylvania State University

Status: Pending

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 1%

Title: Characterization of Turbine Performance with Varying Inlet Temperature Profiles

Sponsor: Energy Advanced Research Projects Agency as a sub from HolosGen LLC

Period of Performance: 4/1/2020-3/31/2021

Total Budget Requested: \$90,000

Location of Project: The Pennsylvania State University

Status: Pending

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0

Title: Optical Heat Flux Measurements for Engine and Turbine Rigs to Accelerate Turbine Development

Sponsor: Office of Naval Research

Period of Performance: 2/1/2021-1/31/2022

Total Budget Requested: \$698,920

Location of Project: The Pennsylvania State University

Status: Pending

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0

Title: De-risking “plug-and-play” Microreactor Components Using a Nuclear Prototype

Sponsor: Department of Energy as a sub from HolosGen LLC

Period of Performance: 4/1/2021-3/31/2026

Total Budget Requested: \$800,000

Location of Project: The Pennsylvania State University

Status: Pending

Person-Months per Year Committed to the Project: Cal/Smr/Acad: 0